

EXHIBITIONS AND NOTICES.

February 6th, 1917.

Prof. E. W. MACBRIDE, D.Sc., F.R.S., Vice-President,
in the Chair.

The SECRETARY read the following report on the Additions made to the Society's Menagerie during the months of November and December 1916 :—

NOVEMBER.

The registered additions to the Society's Menagerie during the month of November were 60 in number. Of these 50 were acquired by presentation, 8 were received on deposit, and 2 by purchase.

The number of departures during the same period, by death and removals, was 115.

Amongst the additions special attention may be directed to :—

2 Grizzly Bears (*Ursus horribilis*), from North America, deposited on November 21st.

DECEMBER.

The registered additions to the Society's Menagerie during the month of December were 27 in number. Of these 15 were acquired by presentation, and 12 were received on deposit.

The number of departures during the same period, by deaths and removals, was 120.

Amongst the additions special attention may be directed to :—

1 Sing-Sing Waterbuck (*Cobus defassa*) ♂, from W. Africa, deposited on December 8th.

1 Kashmir Deer (*Cervus hanglu*) ♀, from Kashmir, presented by H.G. The Duke of Bedford, K.G.

Mr. EDWARD GERRARD, on behalf of Mr. Crabb, exhibited a mounted specimen of a bird bred and reared in captivity under conditions in which it seemed certain that it was a hybrid between a male Thrush (*Turdus musicus*) and a female Black-bird (*Merula merula*).

February 20th, 1917.

Dr. A. SMITH WOODWARD, F.R.S., Vice-President,
in the Chair.

The SECRETARY read the following report on the Additions made to the Society's Menagerie during the month of January 1917 :—

The registered additions to the Society's Menagerie during the month of January were 118 in number. Of these 49 were acquired by presentation, 58 were received on deposit, 5 by purchase, 4 in exchange, and 2 were born in the Gardens.

The number of departures during the same period, by death and removals, was 128.

Amongst the additions special attention may be directed to :—

1 White-bellied Hedgehog (*Erinaceus albiventris*), new to the Collection, from Dakar, Senegal, presented by Mrs. C. H. A. Reaney on January 20th.

1 Greater Double-collared Sunbird (*Cinnyris afer*), new to the Collection, from South Africa, presented by Alfred Ezra, F.Z.S., on January 4th.

1 Three-lined Snake (*Trimerorhinus triaeniatatus*), new to the Collection, from Nakuro, British East Africa, presented by R. Holmes on January 19th.

12 Beautiful Tree-Frogs (*Hyla pulchella*), new to the Collection, from Cordova, Argentine, presented by W. A. Smithers, C.M.Z.S., on January 29th.

Mr. D. SETH-SMITH, F.Z.S., Curator of Birds, exhibited the trachea from a male *Anseranas semipalmata*, showing its extraordinary convolution, which had been described by Latham so long ago as 1797. The exhibitor stated that neither in this species nor in *Phonygama keraudreni*, another species with a greatly developed convoluted trachea, did the birds produce any great volume of sound, such as might be expected from so elaborate an arrangement.

Notes from the Caird Insect House.

Mr. C. J. C. POOL, Assistant Curator of Insects, read the following notes upon species bred and exhibited :—

LEPIDOPTERA.

The Magpie Moth (Abraxas grossulariata).

Vast numbers of larvæ were collected in North London district

and turned out upon *Euonymus* plants. This species is a good exhibit as it is visible in all stages.

A long series of varieties have been preserved and are now exhibited. The larvæ display considerable variation of colour, some of them being almost completely black. I was advised to isolate these melanic forms with the idea of producing some unusually dark imagoes. I selected 73 melanic larvæ, but the results were disappointing, and I found the adults merely varied like those bred from unselected larvæ.

ODONATA.

Dragon-flies in the earlier stages have done well in the tanks. The following species have been bred:—*Eschna grandis*, *E. juncea*, *Brachytron pratense*, *Libellula quadrimaculata*, *Orthetrum cerulescens*, and *Agrion puella*. Specimens have been preserved, together with the nymph skins from which they emerged.

We have no difficulty in rearing these creatures, as they feed upon other insects bred in the tanks; our trouble begins with the emergence of the Dragon-fly, which is a very fastidious feeder and will only take insects in active flight in hot sunshine.

The right conditions are obtainable only in an outdoor enclosure, which we hope to provide later, to exhibit these creatures during their natural adult life, which varies from one to three months.

COLEOPTERA.

Teratological specimens.

Tetropium gabrieli.

Some larch logs were received from Sutton Park, Staffordshire, infested with larvæ of this species.

One adult specimen, which emerged in the house, has malformed antennæ, the right member of the pair having an additional branch consisting of five joints.

Donacia linearis.

Specimens were collected at Waltham Abbey and exhibited on reeds in a shallow tank.

One specimen has ten instead of eleven joints to the antennæ, the eighth joint on each side being almost equal in length to joints 8 and 9 of a normal specimen.

Bananas as Food for Beetles.

The problem of providing suitable food for various species of Coleoptera, whose ordinary feeding-habits are as different as

Proc. Zool. Soc.—1917, No. VII.

those of the lion and the lamb, has been solved in the Insect House by using the banana.

The following list of beetles and their ordinary foods, from which, under natural conditions, some of these insects are rarely, if ever, found very far distant, will form an interesting record of species which during the years 1915-1916 have been found to thrive partly or wholly upon this fruit :—

Voracious ground-beetles.

Ordinary Food.

	Usually other insects.
<i>Carabus violaceus.</i>	
" <i>nemoralis.</i>	" " "
" <i>glabratus.</i>	" " "
" <i>auratus.</i>	" " "
" <i>catenulatus.</i>	" " "
<i>Calosoma inquisitor.</i>	" " "
<i>Pterostichus vulgaris.</i>	" " "
" <i>ater.</i>	" " "
" <i>madidus.</i>	" " "
<i>Harpalus ruficornis.</i>	" " "

Aquatic species.

Hydrophilus piceus.

General scavenger, vegetable or animal matter.

Wood-boring species.

Dorcus parallelipedus.

Moist rotten wood (comes to sugar).

Saperda carcharias.

Foliage and bark of young stems of poplar.

Clytus mysticus.

Hawthorn blossom.

 " *arietis.*

 " "

Aromia moschata.

Flowers; sap and foliage of willow.

Hylobius abietis.

Fir bark.

Hylesinus crenatus.

Ash bark.

Scolytus destructor.

Elm bark.

 " *intricatus.*

Oak bark.

Elater pomonee.

Flowers in summer (larva in decayed beech).

Dung-feeding species.

Geotrapes spiniger.

 " *stercorarius.*

Horse-dung or decayed fungi.

 " *sylvaticus.*

Rabbit-dung.

 " *typhous.*

Plant-feeding species.

Chrysomela fastuosa.

Leaves of willow.

 " *graminis.*

Leaves of willow and wild mint.

 " *hyperici.*

Leaves and flowers of hypericum.

Adult Insects which do not feed.

It is well known that many species of Lepidoptera, of which the Atlas Moth of India is a good example, are incapable of feeding in the adult state. The larva, when full fed, having enclosed itself in a protective cocoon and changed to the pupa, has provided itself with sufficient nourishment to sustain it over the very often far distant period of short, if energetic, adult life.

The length of life varies according to temperature, which if high will produce great nocturnal activity, quickly exhausting the energy of the insect. Prof. H. M. Lefroy says these creatures usually become a complete wreck in three nights in the tropics. I have frequently kept them alive and in almost perfect condition for from 10 to 16 days by transferring them to a cooler case immediately after emergence from the cocoon.

Little has ever been written about the feeding-habits of Coleoptera belonging to the Longicorn group, often referred to as wood-feeders, which is generally only correct as regards the larvæ.

I have studied these beetles alive, both in the field and in captivity, and it is my opinion that in their feeding-habits as adults we must regard them under two headings, viz., those which feed upon flowers or foliage of various plants and trees and those which, like the Atlas Moths, do not feed at all.

Those which feed may be seen in active flight or settled upon their food-plants in hot sunshine.

The following list includes the nocturnal species tested in the Insect House, and which I have failed to attract with any of the foods which appeal to the diurnal species :—

Prionus coriarius.
Asemum striatum.
Tetropium gabrieli.
Crioccephalus polonicus.
 „ *rusticus.*

Experiments with living Specimens of the Sexton Beetles

Necrophorus humator (black) and *N. ruspator* (red and black).

Offered as food to the following animals in the small Mammal house :—

Egyptian Mongoose.—Seized and devoured both species without hesitation.

S. American Coati.—Lost sight of the first beetle, but afterwards sniffed and followed its trail right across the cage. It then picked up the beetle in its mouth, and, after spitting it out several times, finally devoured it.

The White Marmoset.—This little animal never refuses an insect, but there was some hesitation about attacking these foul-smelling beetles. However, its love of insect-food overcame everything else, and after much sniffing and spitting two were devoured.

The Meercats.—Smelt, but would not touch, either species. I often feed these animals with such species as *Dytiscus marginalis*, *Carabus violaceus*, and *Geotrupes sylvaticus*.

Cupuchin Monkeys.—These animals seized both species readily. One female monkey satisfied herself with eating some of the numerous parasitic mites from the body of the beetle. A male monkey ate three beetles, and then stole and devoured the one held by the female.

March 6th, 1917.

Dr. S. F. HARMER, Sc.D., F.R.S., Vice-President,
in the Chair.

Work of the Beavers in the Society's Gardens.

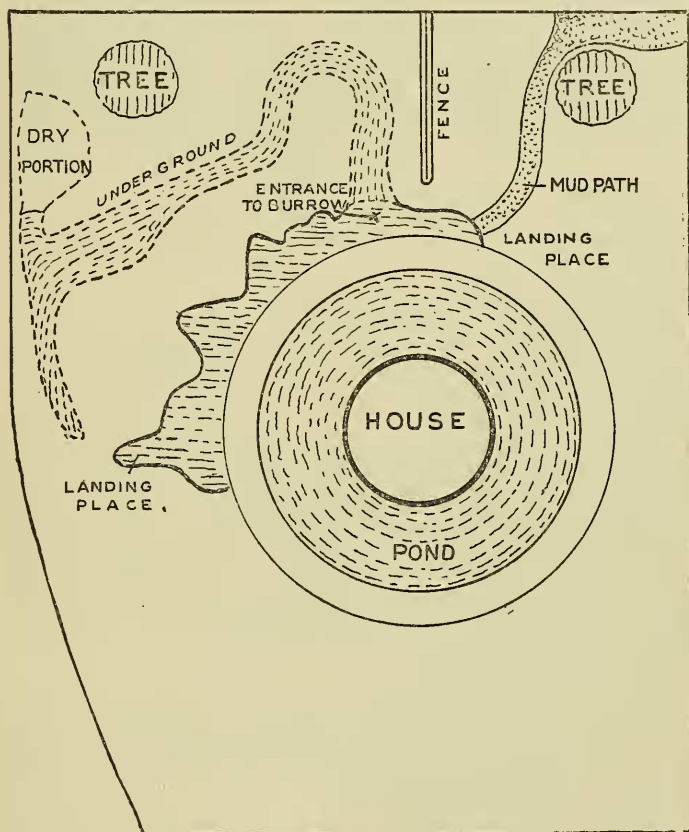
Mr. R. I. POCKOCK, F.R.S., F.Z.S., Curator of Mammals, gave an exhibition illustrated by lantern-slides to show the work of the Beavers in the old enclosure in the Gardens, and remarked:—

“Until the middle of 1913 the pair of Canadian Beavers had shown no special activities of any kind, apart from felling in characteristic manner the tree-trunks erected for that purpose. In the summer of 1913, however, a shallow pool appeared in the surface-clay of their enclosure. This they proceeded to deepen and widen by digging out the bottom and sides. They carried away the excavated clay and plastered it in different places, especially up against the fence. From the enlarged pool they drove an open channel through the soil for about a couple of yards; but this they soon roofed over with small logs and straw plastered with mud, so that their subsequent operations were concealed from view. But from the end of the channel and continuous with it, as it afterwards transpired, they dug out a burrow nearly three yards in length and passing under the root of a witch elm. The first intimation we had of this was the appearance of a hole, smaller than a rabbit's burrow, close to the fence on the side remote from the pool where the channel started. This hole they built up with tufts of straw and a small log or two, possibly to prevent the clay falling in.

When I opened the burrow to satisfy myself that it was not being carried beneath the fence, it appeared to me that the hole

at the end was a ventilator. At all events no attempt had been made to enlarge it for exit or entry, and the part of the burrow it opened into was a comparatively large chamber, wide enough for the beavers to turn about in and deep enough for them to immerse themselves under the water. The narrower part of the

Text-figure 1.



Plan of the old enclosure for Beavers, showing the work done by the animals.

burrow was from $1\frac{1}{2}$ to 2 ft. wide and about 2 ft. deep from the surface of the ground, the soil of its roof being only a few inches thick. It was rather more than half full of water, continuous with that of the pool at the entrance, which we subsequently found proceeded from a burst underground pipe.

In the evening of the day on which the burrow was opened one of the beavers started to repair the damage done, using straw, branches, and mud for the purpose. The task occupied him off and on the whole of the day following. He dug up the wet clay from the bottom of the burrow and plastered it with his paws over the straw and branches which he had previously laid in place to roof the open channel.

From that date until the summer of 1916 the burrow was left undisturbed and two litters were born in it. The beavers, however, were never idle. Working from the pool, at the entrance of the burrow, they dug out a channel in an opposite direction from the first, but roughly in the same line for a few yards, then turned it with a sharp bend towards the artificial pond in the centre of the enclosure. This channel was roofed over in the same way as the first. In the meantime they had excavated a trench up against the concrete wall of this pond on the side where the burrow was situated, and the roofed-in channel was continued till it communicated with this trench, which was deep enough for the beavers to swim in except at one or two places on the margin where shallow landing-places were made.

So long as the beavers were supplied with straw, branches, and logs, they employed them continually for strengthening the roof of the burrow or heightening the roof of the terminal portion up against the fence. When the enclosure was done away with in 1916, this portion where the burrow ended was found to consist of a comparatively large chamber partly filled with water; but at the very end towards the trunk of the witch elm above referred to, there was a flat dry platform above the level of the water and about large enough to accommodate two beavers and their young. There was no bedding on this platform, merely a scanty covering of wood-chips. This part of the burrow was ventilated through chinks in the fence left open by the beavers, and from it a narrow passage, ending blindly, ran in the direction of the trench, and would probably have been carried through to it, giving the burrow a second entrance.

The main points in the structure of the burrow are shown in the plan of the enclosure (fig. 1, p. 101). The circular central area is the brick-house surrounded by the concrete pond, and the mud path is a beaten track along which the beavers used to carry the mud to pile up against the fence.

I have watched the beavers at work night after night, and can confirm the observation of others as to their methods and activities. They carry mud in their fore-paws tucked up against the throat and chin and walk the while flat-footed on their hind feet, with a kind of awkward waddle, the tail trailing behind and acting as a support and balance. Mud is laid on with the fore-paws to fill up chinks between branches and left to dry. It is never smeared over or pressed down with the tail, but sometimes it is jammed tightly home with the muzzle.

In the warmer months of the year the beavers seem to be pervaded with a restless energy, driving them to work with the materials at hand, whether there was anything to achieve or not. Their industry is certainly wonderful; but I was equally struck by the amount of absolutely aimless work they put in. Time and again I have seen a beaver, with infinite labour, haul a log out of the pond, pull it over the rough ground up to the top of the burrow and lay it there; then seizing it again, tug it back to the spot he started from. I have never seen any indication of intelligent co-operation between two beavers in shifting a log too heavy for one. If two get hold of the same log they do not work together and haul it in one direction, but tug and push in such a way that the efforts of the one counteract those of the other."